

**Translation**

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>P 67780</b>	<b>FOR FURTHER ACTION</b> See Form PCT/IPEA/416	
International application No. <b>PCT/DE2004/001521</b>	International filing date ( <i>day/month/year</i> ) <b>14.07.2004</b>	Priority date ( <i>day/month/year</i> ) <b>19.08.2003</b>
International Patent Classification (IPC) or national classification and IPC <b>B23K20/12, B23P6/04</b>		
Applicant <b>GKSS-FORSCHUNGSZENTRUM</b>		

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>6</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of <u>2</u> sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>																									
<p>4. This report contains indications relating to the following items:</p> <table> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>		<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

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International application No.

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## Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-9 \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the claims:
- nos. \_\_\_\_\_ as originally filed/furnished
- nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19
- nos.\* 1-7 \_\_\_\_\_ received by this Authority on 17.02.2005 with letter of 16.02.2005
- nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the drawings:
- sheets 1 \_\_\_\_\_ as originally filed/furnished
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	6	YES
	Claims	1-5, 7	NO
Inventive step (IS)	Claims		YES
	Claims	1-7	NO
Industrial applicability (IA)	Claims	1-7	YES
	Claims		NO
2. Citations and explanations (Rule 70.7)			
<p>Certain observations</p> <p>Claim 1 defines a method for at least locally increasing the strength and/or load-bearing capacity of workpieces. A general definition of this kind also encompasses all methods for repairing workpieces which tear owing to a localised defect in the metallurgy of the workpiece material. These workpieces have an area of low strength and/or load-bearing capacity. The repair would locally increase this strength and/or load-bearing capacity.</p> <p>Claim 1 further specifies that the second workpiece is brought into friction contact with the first workpiece as required for friction welding, and the friction is maintained until a welding temperature situated below the melting point of the two workpiece is obtained. This definition exactly matches the definition of friction stir butt welding, wherein the temperature of both workpieces during the rotation of the tool (in the case of friction stir welding) or of one of the two workpieces (in the case of friction stir butt welding) is maintained below the melting point of the workpieces (that is to say, there is no melting of the two workpieces). Owing to</p>			

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	<p>the friction between the two workpieces or between the two workpieces and the tool, the temperature of the zones of the workpieces in contact is increased to the plastic range of the workpiece materials but always remains below the melting point.</p> <p>1. Documents cited</p> <p>Reference is made to the following documents:</p> <p><i>D1: US-B-6 328 2611 (T. WOLLASTON ET AL) 11 December 2001 (2001-12-11)</i></p> <p><i>D2: US-A-5 975 406 (M.W. MAHONEY ET AL) 2 November 1999 (1999-11-02)</i></p> <p><i>D3: GB-A-2 306 365 (WELDING INSTITUTE) 7 May 1997 (1997-05-07)</i></p> <p><i>D4: US-A-3 487 530 (R. J. ELY) 6 January 1970 (1970-01-06)</i></p> <p><i>D5: US 2003/047584 A1 (K. OKAMOTO ET AL) 13 March 2003 (2003-03-13)</i></p> <p><i>D6: DATABASE WPI Section Ch, Week 200308 Derwent Publications Ltd., London, GB; Class M23, AN 2003-080046 XP002309664 &amp; JP 2002 283071 A (MAZDA KK) 2 October 2002 (2002-10-02).</i></p> <p>2. Claims 1-7</p> <p>Document D1 discloses (the references between parentheses relate to D1) a method for at least locally increasing the strength and/or load-bearing capacity of workpieces (65; figures 22-23), wherein a first workpiece (65) is initially</p>

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	<p>produced using a conventional manufacturing method (implied from D1), wherein the first workpiece is then provided with a hole in the area in which strength and/or load-bearing capacity is to be increased (figure 22) and then a second workpiece (67) consisting of a material which increases strength and/or load-bearing capacity is introduced into the hole and in this state the second workpiece (67) workpiece is brought into friction contact with the first workpiece as required for friction welding, and friction is maintained until a welding temperature situated below the melting point of the two workpieces (65, 67) is obtained for the purpose of producing a friction-welded connection between the two workpieces (65, 67) (using friction stir butt welding; column 8, lines 32-42, see also document D2 for details regarding the steps of a friction welding method of this kind).</p> <p>Consequently, the subject matter of the above claim is not novel (PCT Article 33(2)). Documents D2 to D4 likewise disclose the subject matter of claim 1 (D2: see figures 3a-e and 4a-d, and column 3, line 27, to column 4, line 64, wherein zone 48 is not produced with molten material, only plastically deformed material; document D3: likewise only plastically deformed, that is to say, no melting of the material of piece 5, see page 7, lines 67-17; document D4, see in particular claim 1, wherein pressure and temperature are selected such that diffusion</p>

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	<p>welding without melting of the two workpieces is carried out).</p> <p>Dependent claims 2-7 contain no features which, combined with the features of any claim to which they refer, meet the PCT requirements for novelty and inventive step (PCT Article 33(2) and (3)). (See document D1 for claims 2-5 and 7; see document D2 for claims 2-3, 5 and 7; see document D4 for claims 2-4; see document D5 or D6 for claim 6).</p>